

### **Remarks**

Claims 1-9, 17-21, 54, 55, and 58-66 have been canceled. Claims 10 and 14 are amended. Claims 34-53, 56, 57, and 67-69 have been withdrawn from consideration. Claims 70 to 81 have been added. Claims 10-16, 22-33, and 70-81 are pending.

### **§ 103 Rejections**

Claims 1-9, 16-21, and 58-66 stand rejected under 35 USC § 103(a) as being unpatentable over Collins in view of Shaw.

Claims 1-9, 17-21, and 58-66 have been canceled rendering the rejection with respect to these claims mute.

Applicants note that the Examiner has indicated that claims 10-16 are free of the prior art. However, the Examiner also indicated that claim 16 is rejected under 35 USC § 103. Applicants assume that claim 16 is rejected. If this is the case, Applicants request that claim 16 be cancelled.

Applicants note that no rejection was made with respect to claims 22-33. Applicants assume that these claims are allowed over Collins in light of Shaw.

Claims 70-81 have been added. Support for claim 70 can be found at page 3, lines 6-15; page 3, lines 20-24; page 5, line 30 – page 6, line 6; and Figure 3. Support for claim 71 can be found at page 6, line 7-16, and Figure 4. Support for claims 72-81 can be found in original claims 3, 6, 8-10, 14-15, and 17-19, respectively.

Applicants believe that claims 70-81 overcome Examiner's rejection of the now canceled claims under 35 USC § 103 as being unpatentable over Collins in view of Shaw.

Neither Collins nor Shaw teach that the article is exposed to E-beam radiation through the second side of the liner to cross link the adhesive. Examiner noted that the previous independent claims failed to recite that the E-beam crosslinked the adhesive. Examiner also asserted that this argument was unpersuasive as it is directed to a process step for making the product, and thus not germane to the issue of patentability of the product itself.

Independent claims 70 and 71 clearly state that the E-beam crosslinks the adhesive.

Applicants' product differs from the prior art products in several respects. First, if the adhesive is exposed to E-beam radiation through the non-liner side, the adhesive properties of the adhesive polymer itself are altered. In order to maintain an acceptable level of adhesion on both

side of the double-sided adhesive tape, the adhesive polymer must be E-beam treated through the liner side. (See, page 2, lines 5-11.) Second, the surface chemistry of silicone-liners traditionally used in double sided adhesive tape is also altered when E-beam treated. This creates the undesirable situations of “liner confusion” or “liner blocking” if the adhesive wound into a roll. (See, page 2, lines 12-24.)

A prior art solution to these problems has been to E-beam the adhesive through a temporary liner, and then replace this liner with another liner before forming the final product. (See, page 2, lines 25-27.) Applicants’ product addresses these same problems without the added complexity, waste, and cost of using a second liner.

For at least these reasons, Applicants believe that newly added claims 70-81 are patentable over Collins in view of Shaw.

Claims 1-9, 26-33, 54, 55, and 58-66 stand rejected under 35 USC § 103(a) as being unpatentable over Patent Abstract of Japan volume 2000, No. 15, April 6, 2001 (Japan 2000 volume 345113 A; December 12, 2000, abs) (hereinafter, JP2000345113A) in view of Collins (5,847,649). Applicants’ response is based on the attached machine translation of JP2000345113A.

Claims 1-9, 54, 55, and 58-66 have been canceled, rendering this rejection with respect to these claims mute.

Applicants note that no rejection was made with respect to claims 22-25. Applicants assume that these claims are allowable over JP2000345113A in view of Collins. In the event that Applicants’ assumption is incorrect, Applicants’ respectfully request that the Examiner consider the following discussion.

JP2000345113A relates to an adhesive article comprising an E-beam curing-type pressure sensitive adhesive formed on a release liner. The tackiness of the two surfaces of the adhesive is affected by varying the exposure to E-beam radiation. (See, paragraph [0008].) JP2000345113A teaches that if the resulting tape is wound in a roll, the difference in tackiness of the two surfaces will result in a difference in the release property from the front and back surfaces of the release liner. (See, paragraphs [0014] – [0015].) JP2000345113A teaches that if the adhesive is irradiated from the unlined side, the tackiness of the adhesive on the lined side will be greater than the tackiness of the adhesive on the unlined side. (See, paragraph [0011].) However, if the adhesive

is irradiated from the lined side, the opposite effect would be obtained (i.e., the tackiness of the unlined side would be greater than the tackiness of the lined side.) (See, paragraph [0025].)

The present invention is directed to an adhesive article comprising a liner backing having a first and second side; an adhesive on a first side of the liner backing; and a coating material on the second side of the liner backing. The coating material has a sufficiently tightly crosslinked network, levels of polar functionalities and reactive groups such that, upon exposure to E-beam radiation to crosslink the adhesive, the liner release value of the second side of the liner backing to the adhesive is less than the liner release value of the first side of the liner backing to the adhesive. (See, claim 22.)

JP2000345113A teaches that, if the adhesive is exposed to E-beam radiation from the lined side, the tackiness of the unlined side of the adhesive would be greater than the tackiness of the lined side of the adhesive. (See, paragraph [0025].) Thus, if the resulting article was wound in a roll, one would expect the release value from the second side of the liner backing to the adhesive would be greater than the liner release value of the first side of the liner backing to the adhesive. This is exactly opposite to the effect achieved by the present invention.

Also, nothing in JP2000345113A teaches or suggests selecting a release coating having a sufficiently tightly crosslinked network, levels of polar functionalities and reactive groups. In fact, nothing in JP2000345113A teaches or suggests that the release coating must be selected to be compatible with exposure of the liner to E-beam radiation.

Nothing in Collins (US 5,847,649) cures these defects in JP2000345113A. For at least these reasons, claim 22 is patentable over JP2000345113A in view of Collins.

Claims 23-33 each add additional features to claim 22. Claim 22 is patentable for the reasons given above. Thus, claims 23-33 are likewise patentable.

In summary, the rejection of claims 26-33 under 35 USC § 103(a) as being unpatentable over JP2000345113A in view of Collins has been overcome and should be withdrawn.

For the reasons stated above, Applicants also believe that newly added claims 70-81 are patentable over JP2000345113A in view of Collins.

Applicants note that the Examiner has indicated that claims 10-16 are free of the prior art. As indicated, Applicants assume that claims 10-15 are free of the prior art. Claims 10 and 14 have been amended to be in independent form and to incorporate all of the limitations of the claims upon

which they previously depended. Support for the amendments can be found in original claims 1, 10 and 14.

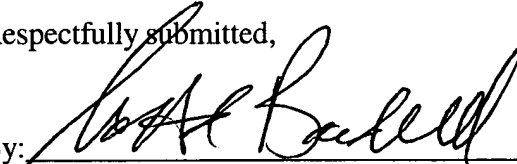
In view of the above, it is submitted that the application is in condition for allowance.  
Reconsideration of the application is requested.

Allowance of claims 10-16, 22-33 and 70-81, as amended, at an early date is solicited.

Respectfully submitted,

29 April, 2003  
Date

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**Version with markings to show amendments made:**

10. (Amended) **An adhesive article comprising:**

**(a) a liner having a first side and a second side;**

**(b) an adhesive having a first surface and a second surface, wherein the second surface of the adhesive contacts the first side of the liner, wherein the article has been exposed to E-Beam radiation through the second side of the liner, and wherein the article has been rolled upon itself, causing the second side of the liner to come into contact with the first surface of the adhesive, and wherein the second side of the liner and the first surface of the adhesive have a liner release value that is less than the liner release value of the first side of the liner to the second surface of the adhesive; and**

**(c) [The adhesive article of claim 1 additionally comprising] a pigment dispersed in the adhesive.**

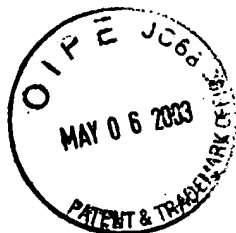
14. (Amended) **An adhesive article comprising:**

**(a) a liner having a first side and a second side; and**

**(b) an adhesive having a first surface and a second surface, wherein the second surface of the adhesive contacts the first side of the liner, wherein the article has been exposed to E-Beam radiation through the second side of the liner, and wherein the article has been rolled upon itself, causing the second side of the liner to come into contact with the first surface of the adhesive, and wherein the second side of the liner and the first surface of the adhesive have a liner release value that is less than the liner release value of the first side of the liner to the second surface of the adhesive, [The adhesive article of claim 1,] wherein said adhesive comprises at least one (meth)acrylic polymer.**

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両面テープおよびその製造方法

(54) [Title of Invention]

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Abstract

(57) 【要約】

【課題】

剥がす際に必ず一方側の剥離ライナーに粘着剤層が付くようにすることができ、しかも低コストであるキャストタイプの両面テープおよびその製造方法を提供すること。

【解決手段】

剥離ライナー2 の上に電子線硬化型粘着剤層 3 を形成してなる両面テープ 1 であって、電子線照射によって粘着剤層 3 の一方の面 4 と他方の面 5 とで粘着力が異なるように構成する。

この場合に、剥離ライナー2 の上に電子線硬化型粘着剤を塗工して粘着剤塗膜 3a を形成し、電子線を照射して、粘着剤塗膜 3a の一方の面 4 と他方の面 5 とで粘着力を異ならせる。

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(57) [Abstract]

[Problems to be Solved by the Invention]

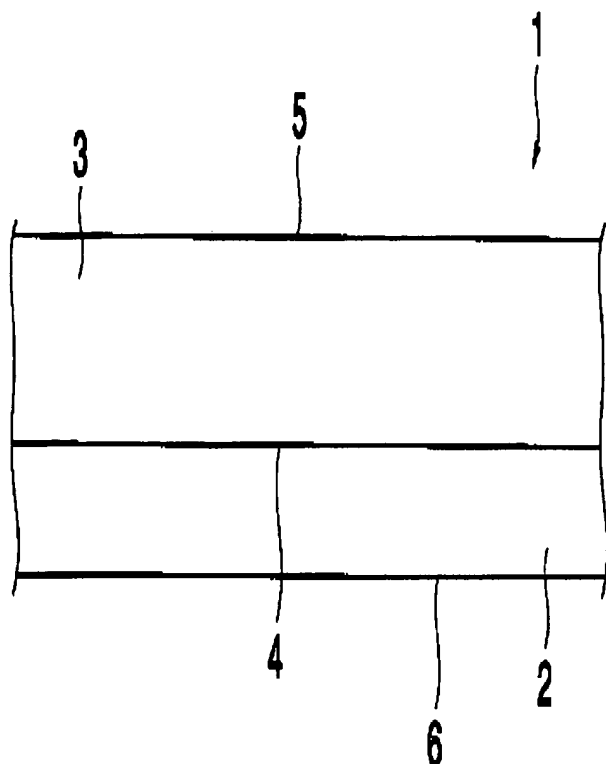
By all means tackifier layer that tries is attached to release liner— of the one side occasion where it peels it is possible , furthermore offer two-sided tape and its manufacturing method of cast type which is a low cost.

[Means to Solve the Problems]

Forming electron beam curing type tackifier layer 3 on release liner—2, in order with two-sided tape 1 which becomes, for tackiness to differ from with one surface 4 and other surface 5 of tackifier layer 3 in electron beam illumination , it constitutes.

In this case, painting electron beam curing type adhesive on release liner—2, it forms adhesive coating 3a, irradiates electron beam, with one surface 4 and other surface 5 of adhesive coating 3a uncommonness trains tackiness る.





## Claims

### 【特許請求の範囲】

#### 【請求項 1】

剥離ライナーの上に電子線硬化型粘着剤層を形成してなり、電子線の照射により粘着剤層の一方の面と他方の面とで粘着力が異なることを特徴とする両面テープ。

#### 【請求項 2】

前記粘着剤層の、剥離ライナー側の粘着剤面の粘着力が他面の粘着力より大きいことを特徴とする請求項 1 に記載の両面テープ。

#### 【請求項 3】

前記粘着剤層の膜厚が 5~100 $\mu$ m であることを特徴とする請求項 1 または請求項 2 に記載の両面テープ。

#### 【請求項 4】

剥離ライナーの上に電子線硬化型粘着剤を塗工して粘着剤塗膜を形成し、電子線を照射して粘着剤塗膜の一方の面と他方の面とで粘着力を異ならせることを特徴とする両面テープ

### [Claim(s)]

#### [Claim 1]

Forming electron beam curing type tackifier layer on release liner—, it becomes, two-sided tape. where in the one surface and other surface of tackifier layer tackiness differs depending upon the lighting of electron beam and makes feature

#### [Claim 2]

two-sided tape. which is stated in Claim 1 where, tackiness of adhesive surface of release liner - side of aforementioned tackifier layer is larger than tackiness of other aspect and makes feature

#### [Claim 3]

film thickness of aforementioned tackifier layer is 5 - 100 $\mu$ m and the two-sided tape. which is stated in Claim 1 or Claim 2 which is made feature

#### [Claim 4]

Painting electron beam curing type adhesive on release liner —, it forms adhesive coating, irradiates the electron beam and with one surface and other surface of adhesive coating uncommonness strains tackiness る manufacturing method.

の製造方法。

【請求項 5】

前記粘着剤塗膜側から電子線を照射して前記粘着剤塗膜の、剥離ライナー側の粘着剤面の粘着力が他面の粘着力より大きくすることを特徴とする請求項 4 に記載の両面テープの製造方法。

【請求項 6】

電子線の加速電圧が 30~125kV であることを特徴とする請求項 4 または請求項 5 に記載の両面テープの製造方法。

【請求項 7】

前記粘着剤塗膜の膜厚が 5~100 $\mu$ m であることを特徴とする請求項 4 ないし請求項 6 のいずれか 1 項に記載の両面テープの製造方法。

【請求項 8】

前記電子線の照射は、真空管型電子線照射装置によってなされることを特徴とする請求項 4 ないし請求項 7 のいずれか 1 項に記載の両面テープの製造方法。

Specification

【発明の詳細な説明】

【0001】

【発明の属する技術分野】

本発明は、支持体を用いずに剥離ライナー上に粘着剤を形成してなるキャストタイプの両面テープの製造方法および両面テープに関する。

【0002】

【従来の技術】

両面テープは、両面が粘着面のフィルム状粘着剤であり、作業性が良い等の液状接着剤にはない特長を有し、しかも経済的であることから、種々の分野で広く用いられている。

【0003】

両面テープとしては、支持体の両側に粘着剤を形成したものが一般的であるが、製造工程の簡略化、製品の薄膜化等の観点から、支持体を用いず、剥離紙上に粘着剤塗膜を塗工し

of two-sided tape which is made feature

[Claim 5]

Irradiating electron beam from aforementioned adhesive coating side, manufacturing method. of the two-sided tape which is stated in Claim 4 which, tackiness of adhesive surface of release liner - side of aforementioned adhesive coating enlarges than tackiness of the other aspect and makes feature

[Claim 6]

acceleration voltage of electron beam is 30 - 125 kV and manufacturing method. of two-sided tape which is stated in Claim 4 or Claim 5 which is made feature

[Claim 7]

film thickness of aforementioned adhesive coating is 5 - 100;  $\mu$  m and the manufacturing method. of two-sided tape which is stated in any one claim of Claim 4 or the Claim 6 which is made feature

[Claim 8]

manufacturing method. of two-sided tape which is stated in any one claim of Claim 4 or Claim 7 which you can do lighting of aforementioned electron beam, with vacuum tube type electron beam illumination device and make feature

[Description of the Invention]

[0001]

[Technological Field of Invention]

this invention without using support forming adhesive on release liner —, regards manufacturing method and two-sided tape of two-sided tape of cast type which becomes.

[0002]

[Prior Art]

As for two-sided tape, both surfaces with film adhesive of sticking surface, has feature which is not or other liquid adhesive where workability is good furthermore from the fact that it is economical, is widely used with various field.

[0003]

As two-sided tape, those which formed adhesive in both sides of support are general, but from making thin film or other viewpoint of simplification and product of the production step, support is not used, adhesive coating is painted on

て製造するキャストタイプの両面テープが製造されている。

【0004】

このようなキャストタイプの両面テープは、通常、剥離ライナー上に粘着剤塗膜を形成したものを巻いてロール状にしているが、剥離ライナーの表裏が同じ材質で、粘着剤塗膜の両側が同じ粘着力を有している場合、テープ使用時に、粘着剤塗膜が剥離ライナー側に付かずに巻き側に付いてしまう、いわゆる泣き別れ現象が生じる場合がある。

【0005】

そこで、従来、このような泣き別れ現象を防止するために、剥離ライナーの表裏面に異なる処理を施して表裏面の剥離性を異ならせ、剥がした剥離ライナーに必ず粘着剤塗膜が付くようにしている。

【0006】

【発明が解決しようとする課題】

しかしながら、このように特殊な剥離ライナーを用いる場合には、剥離ライナー自体の製造工程が複雑化し、使用後に廃棄される剥離ライナーの製造コストが高く、結果として両面テープ自体のコストが上昇してしまう。

【0007】

本発明はかかる事情に鑑みてなされたものであって、剥がす際に必ず一方側の剥離ライナーに粘着剤層が付くようにすることができ、しかも低コストであるキャストタイプの両面テープおよびその製造方法を提供することを目的とする。

【0008】

【課題を解決するための手段】

上記課題を解決するために、本発明は、剥離ライナーの上に電子線硬化型粘着剤層を形成してなり、電子線の照射により粘着剤層の一方の面と他方の面とで粘着力が異なる、すなわち粘着力に差を生じさせたことを特徴とする両面テープを提供する。

【0009】

この場合に、前記粘着剤層の、剥離ライナー側の粘着剤面の粘着力が他面の粘着力より大

release paper and two-sided tape of cast type which is produced is produced.

[0004]

two-sided tape of this kind of cast type, usually, winding those which formed adhesive coating on release liner—, has made roll, but front and back of release liner— being same material, when both sides of adhesive coating has had same tackiness, at time of tape use, adhesive coating without being attached to release liner - side, it winds and is attached on side, so-called it cries and divides and there are times when phenomena occurs.

[0005]

Then, until recently, in order to prevent this kind of crying dividing phenomena, administering treatment which differs to front and back surfaces of the release liner—, be sure to make release property of front and back surfaces differ, adhesive coating thatto have tried it is attached to release liner— which is peeled.

[0006]

[Problems to be Solved by the Invention]

But, this way when special release liner— is used, production step of release liner—itself to do the complication, production cost of release liner— which is abolished after using to behigh, cost of two-sided tape itself rises as result.

[0007]

As for this invention considering to situation which catches, beingsomething which it is possible, by all means tackifier layer that tries is attached to release liner— of one side occasion where it peels it is impossible, furthermore two-sided tape and its manufacturing method of cast type which is a low cost it is offered it makes objective.

[0008]

[Means to Solve the Problems]

In order to solve above-mentioned problem, this invention becomes,forming electron beam curing type tackifier layer on release liner—, in one surface and other surface of the tackifier layer tackiness differs depending upon lighting of electron beam,namely difference was caused offers two-sided tape which is made feature to tackiness.

[0009]

In this case, tackiness of adhesive surface of release liner - side of theaforementioned tackifier layer is larger than

きいことが好ましい。

また、前記粘着剤層の膜厚が 5~100 $\mu$ m であることが好ましい。

【0010】

また、本発明は、剥離ライナーの上に電子線硬化型粘着剤を塗工して粘着剤塗膜を形成し、電子線を照射して、粘着剤塗膜の一方の面と他方の面とで粘着力を異ならせることを特徴とする両面テープの製造方法を提供する。

【0011】

この場合に、前記粘着剤塗膜側から電子線を照射して前記粘着剤塗膜の、剥離ライナー側の粘着剤面の粘着力が他面の粘着力より大きくすることが好ましい。

また、電子線の加速電圧が 30~125kV であることが好ましい。

さらに、前記粘着剤塗膜の膜厚が 5~100 $\mu$ m であることが好ましい。

さらにまた、前記電子線の照射は、真空管型電子線照射装置によってなされることが好ましい。

【0012】

本発明においては、剥離ライナーの上に形成された粘着剤層の一方の面と他方の面とで粘着力を異ならせたので、剥離ライナーとして表裏面の剥離性を異ならせた特殊なものを用いずに、剥がす際に必ず一方側の剥離ライナーに粘着剤層が付くようにすることができ、従来よりも低コストでキャストタイプの両面テープを得ることが可能となる。

【0013】

また、本発明においては、電子線硬化型粘着剤に電子線を照射して粘着剤塗膜の一方の面と他方の面とで粘着力が異なる状態とするので、塗膜の膜厚に応じて適切な出力で電子線を照射すればよく、極めて容易に粘着剤塗膜の一方の面と他方の面とで粘着力を異ならせることができる。

【0014】

【発明の実施の形態】

以下、本発明について具体的に説明する。

tackiness of other aspect, it is desirable .

In addition, film thickness of aforementioned tackifier layer is 5 - 100; $\mu$ m, it is desirable .

[0010]

In addition, this invention, painting electron beam curing type adhesive on release liner—, forms the adhesive coating, irradiates electron beam, with one surface and other surface of adhesive coating uncommonness trains tackiness る manufacturing method of two-sided tape which is made feature is offered.

[0011]

In this case, irradiating electron beam from aforementioned adhesive coating side, tackiness of adhesive surface of release liner - side of aforementioned adhesive coating enlarges than tackiness of other aspect, it is desirable .

In addition, acceleration voltage of electron beam is 30 - 125 kV, it is desirable.

Furthermore, film thickness of aforementioned adhesive coating is 5 - 100; $\mu$ m, it is desirable .

Furthermore and, you can do lighting of aforementioned electron beam, with vacuum tube type electron beam illumination device, it is desirable .

[0012]

Regarding to this invention, because in one surface and other surface of the tackifier layer which was formed on release liner— it made tackiness differ, without using special ones which make release property of front and back surfaces differ as the release liner—, by all means tackifier layer that tries is attached to release liner— of one side occasion where it peels it to be possible , two-sided tape of cast type is obtained with low cost, in comparison with past it becomes possible.

[0013]

In addition, regarding to this invention, irradiating electron beam to the electron beam curing type adhesive, because it makes state where in one surface and other surface of adhesive coating tackiness differs, if it should have irradiated electron beam with appropriate output according to film thickness of coating, quite easily with one surface and other surface of adhesive coating tackiness uncommonness trains, る it is possible .

[0014]

[Embodiment of the Invention]

You explain concretely below, concerning this invention.

本発明では、図 1 に示すように、剥離ライナー 2 の上に粘着剤層 3 を形成してなるキャストタイプの両面テープ 1 において、粘着剤層 3 の剥離ライナー 2 側の面 4 と上面 5 とで粘着力が異ならせている。

この両面テープ 1 は、図 2 に示すように、巻き取られてロール状とされる。

したがって、粘着剤層 3 の上面 5 が剥離ライナー 2 の外側面 6 に密着した状態となる。

【0015】

この場合に、従来は、粘着剤層の両面の粘着力に差がないため、剥離ライナー 2 と粘着剤層 3 とが泣き別れしないようにするために剥離ライナーの表裏面に異なる処理を施して表裏面の剥離性を異ならせ、剥がした剥離ライナーに必ず粘着剤層が付くようにしている。

【0016】

これに対して、本発明のように粘着剤層 3 の表裏面の粘着性を異なるようにすることにより、上記剥離ライナー 2 に従来のように特殊な処理を施す必要をなくすることができる。

【0017】

本発明においては、このように粘着剤層 3 の剥離ライナー 2 側の面 4 と上面 5 とで粘着力を異ならせるために、図 3 に示すように、粘着剤として電子線硬化型粘着剤 7 を剥離ライナー 2 上に塗工して粘着剤塗膜 3a を形成し(第 1 工程)、次いで、粘着剤塗膜 3a 側から電子線 8 を照射する(第 2 工程)。

【0018】

この際に照射する電子線の出力は、電子線の到達深度が粘着剤塗膜 3a の途中になるように調整される。

すなわち、本出願人が先に提案した特開平 10-158413 号に基づいて、粘着剤塗膜 3a に対して厚さ方向途中の所定の深さまでの到達深度を有する加速電圧で電子線を照射することにより、その部分までの架橋密度を高くすることにより、粘着剤塗膜 3a の上面 5 の架橋密度が剥離ライナー 2 側の面 4 の架橋密度よりも高くなり、結果として上面 5 の粘着力よりもライナー側の面 4 の粘着力のほうを高くすることができる。

In this invention, as shown in Figure 1, forming tackifier layer 3 on release liner—2, in surface tackiness makes differ from 4 of release liner—2 side of tackifier layer 3 and upper surface 5 in two-sided tape 1 of cast type which becomes.

This two-sided tape 1, as shown in Figure 2, being retracted, makes roll.

Therefore, it becomes state which upper surface 5 of tackifier layer 3 sticks to outside surface 6 of release liner—2.

[0015]

In this case, administering treatment which differs to front and back surfaces of release liner— in order until recently, because there is not a difference in tackiness of both surfaces of tackifier layer, for release liner—2 and tackifier layer 3 that to try cry and do not divide be sure to make release property of front and back surfaces differ, tackifier layer that to have tried it is attached to release liner— which is peeled.

[0016]

Vis-a-vis this, like this invention tackiness of front and back surfaces of tackifier layer 3 by it tries to differing, in above-mentioned release liner—2 conventional way the necessity to administer particular processing it is possible not to be.

[0017]

Regarding to this invention, this way in surface 4 of release liner—2 side of the tackifier layer 3 and upper surface 5 uncommonness it trains tackiness, as る for the sake of, shown in Figure 3, painting electron beam curing type adhesive 7 on release liner—2 as the adhesive, it forms adhesive coating 3a and (first step ), next, it irradiates electron beam 8 from adhesive coating 3a side (second step ).

[0018]

Output of electron beam which is irradiated in this case is adjusted, in order for arrival depth of electron beam to be middle of adhesive coating 3a.

By making crosslink density to portion high by irradiating electron beam with acceleration voltage which possesses arrival depth to predetermined depth in thickness direction middle on basis of Japan Unexamined Patent Publication Hei 10-158413 number which main applicant of namely, proposes before, vis-a-vis adhesive coating 3a, crosslink density of upper surface 5 of the adhesive coating 3a it becomes high in comparison with crosslink density of surface 4 of release liner—2 side, As result it can make tackiness of surface 4 of liner side high in comparison with tackiness of upper surface 5.

【0019】

このように到達深度を適切に調整する観点からは、電子線の加速電圧は 30~125kV であることが好ましく、40~100kV がより好ましい。

また、粘着剤層 3 の膜厚は 5~100 $\mu$ m が望ましい。

膜厚が 5 $\mu$ m 未満であれば、2 つの面間で粘着力の差がつきにくく、膜厚が 100 $\mu$ m を超えると両面テープとして厚くなりすぎる。

膜厚のさらに好ましい範囲は 10~70 $\mu$ m であり、より一層好ましい範囲は 20~60 $\mu$ m である。

【0020】

30~125kV(より好ましくは 40~100kV)という低出力の電子線を照射するためには、真空管型の電子線照射部を有する電子線照射装置を用いることが好ましい。

真空管型の電子線照射部は、図 4 の(a)に示すように、円筒状をなすガラス、セラミックまたは金属製の真空容器 11 と、その容器 11 内に設けられ、陰極から放出された電子を電子線として取り出してこれを加速する電子線発生部 12 と、真空容器 11 の端部に設けられ、電子線を射出する電子線射出部 13 と、図示しない給電部より給電するためのピン部 14 とを有する。

また、電子線射出部 13 には薄膜状の照射窓 15 が設けられている。

電子線射出部 13 の照射窓 15 は、ガスは透過せずに電子線を透過する機能を有しており、図 4 の(b)に示すように、扁平状をなしている。

そして、照射室内に配置された被照射物に照射窓 15 から射出された電子線が照射される。

【0021】

このような真空管型の電子線照射部を有する電子線照射装置は、一例として米国特許第 5,414,267 号に開示されており、American International Technologies(AIT) 社により Min-EB 装置として検討されている。

この装置においては、100kV 以下という低加速電圧でも電子線の透過力の低下が小さく、有効に電子線を取り出すことができる。

[0019]

This way, as for acceleration voltage of electron beam they are 30 - 125 kV from viewpoint which adjusts arrival depth appropriately, it is desirable, 40 - 100 kV are more desirable.

In addition, film thickness of tackifier layer 3 5 - 100; $\mu$ m is desirable.

If film thickness is under 5; $\mu$ m, difference of tackiness becomes too difficult to be attached, when film thickness exceeds 100; $\mu$ m, thick between 2 aspects as two-sided tape.

film thickness furthermore as for desirable range with 10 - 70; $\mu$ m, as for further desirable range they are 20 - 60; $\mu$ m.

[0020]

In order 30 - 125 kV (more preferably 40~100 kV) with to irradiate electron beam of low output which is said, electron beam illumination device which possesses electron beam illumination section of vacuum tube type is used, it is desirable.

electron beam injector 13 where electron beam illumination section of vacuum tube type, as shown in (a) of Figure 4, is provided in vacuum container 11 of glass, ceramic or metallic which forms cylinder and inside container 11 this is provided in end of electron beam generating part 12 and vacuum container 11 which accelerate as electron beam removing the electron which is discharged from cathode, injection does electron beam and, It possesses pin 14 in order electricity supply to do from unshown electrical supply part.

In addition, lighting window 15 of thin film is provided in electron beam injector 13.

Lighting window 15 of electron beam injector 13 gas without transmitting has had function which transmits electron beam, as shown in (b) of the Figure 4, forms flat.

And, electron beam which injection is done is irradiated to article being irradiated which is arranged inside illumination chamber from lighting window 15.

[0021]

electron beam illumination device which possesses electron beam illumination section of this kind of vacuum tube type is disclosed in U.S. Patent 5,414,267 number as one example, is examined with American international Technologies (AIT) corporation as Min-EB equipment.

Regarding this equipment, decrease of transmission intensity of electron beam is small even with low acceleration voltage, 100 kV or less, removes electron beam effectively it is possible.

これによって、基材上の被覆材に対し低深度で電子線を作用させることが可能となる。

【0022】

従来から多用されているドラムタイプの電子線照射装置は、ドラム内を常に真空引きしながら電子線を照射するものであって本質的に出力が大きく、加速電圧 100kV 以下の低出力領域で出力を適切に調整することは困難であるが、上記真空管タイプのもを使用することにより加速電圧 100kV 以下で容易に加速電圧を制御することができる。

【0023】

本発明においては、上述したように、剥離ライナー 2 は、両面の剥離性を異ならせる必要はなく、両面同一な処理が施されたものを用いればよい。

剥離ライナー 2 の材質としては、上質紙、グラシン紙等の紙類、紙の両面にポリエチレンをラミネートしたもの、ポリエチレン、ポリエステルフィルム等の両面にシリコン樹脂などの離型剤をコートしたものを用いることができる。

【0024】

粘着剤層 3 としては、ビニル重合型(シアノアクリレート系、ジアクリレート系、不飽和ポリエステル樹脂系)、縮合型(フェノール樹脂系、ユリヤ樹脂系、メラミン樹脂系)、重付加型(エポキシ樹脂系、ウレタン樹脂系)などの反応硬化型(モノマー型、オリゴマー型)のものが挙げられる。

【0025】

なお、上記実施形態では、粘着剤層 3 において上面 5 の粘着力よりもライナー側の面 4 の粘着力のほうを高くしたが、逆であってもよく、その場合には巻き取りを、粘着剤層側を外側にして行うか、電子線照射を剥離ライナー側から行う。

また、粘着剤層の形成を押し出し機等により行ってもよい。

【0026】

【実施例】

以下、本発明の実施例について説明する。

(実施例 1)

Now, electron beam it operates it becomes possible with low depth vis-a-vis coated material on substrate.

[0022]

As for adjusting output appropriately in low output territory of the acceleration voltage 100 kV or less as for electron beam illumination device of drum type which is used than past, while always pulling a vacuum doing inside drum, being something which irradiates electron beam, output to be large essentially, it is difficult it can control acceleration voltage easily with acceleration voltage 100 kV or less, but by using those of above-mentioned vacuum tube type.

[0023]

Regarding to this invention, above-mentioned way, release property of the both surfaces uncommonness it trains release liner-2, there is not a necessity and it should have used those where both surfaces same treatment is administered.

As material of release liner-2, those which laminate polyethylene in both surfaces of high quality paper, glassine paper or other paper and paper. Those which silicon resin or other mold release coating are done can be used for both surfaces of film of polyethylene, polyester.

[0024]

As tackifier layer 3, vinyl polymerizing type (cyano acrylate, diacrylate system and unsaturated polyester resin system), condensation type (phenolic resin system, urea resin system and melamine resin system), you can list those of the polyaddition type (epoxy resin system and urethane resin system) or other reaction curing type (monomer type, oligomeric).

[0025]

Furthermore, with above-mentioned embodiment, it made tackiness of surface 4 of liner side high in comparison with tackiness of upper surface 5 in tackifier layer 3, but it is possible to be opposite, in that case the windup, tackifier layer side it does electron beam illumination from release liner - side does in outside.

In addition, it is possible to form tackifier layer with extruder etc.

[0026]

[Working Example(s)]

You explain below, concerning Working Example of this invention.

(Working Example 1)

両面の剥離性が同じ剥離ライナー(東セロ株式会社製 SP-PET-B1-50-BU)上に電子線硬化型粘着剤、ビスコタック(大阪有機化学工業株式会社製)をアプリケーションで塗工して膜厚約 40 $\mu$ m の粘着剤塗膜を形成し、AIT 社製 Min-EB 電子線照射装置を用いて酸素濃度 50ppm 以下で加速電圧 65kV で 3 水準の吸収線量になるように電子線を照射し、1 面(照射面)のボールタックを測定した。

さらにローラを用いて PET フィルムにその粘着剤を貼付け、剥離ライナーを取り除いた後、2 面(剥離ライナー側面)のボールタックを測定した。

なお、膜厚測定はソニー株式会社製 $\mu$ -mate によって行い、ボールタック測定は傾斜式ボールタック JIS Z 0237 に準拠して行った。

また、電子線を照射した際の吸収線量は、Far West Technology 社製、FWT60-00 線量測定フィルムによって測定した。

その際の電子線の照射条件を表 1 に、ボールタックの測定結果を表 2 に示す。

【0027】

照射条件			
吸収線量 (kGy)	40	30	20
加速電圧 (kV)			
65	a	b	c

【表 1】

release property of both surfaces on same release liner— (Tohcello Co., Ltd. make SP-PET-B1- 50-BU ) painting electron beam curing type adhesive、 bis  $\square$  tackiness (Osaka Organic Chemical Industry Ltd. (DB 69-089-7699 ) make) with applicator, adhesive coating of film thickness approximately 40; $\mu$ m was formed, in order with oxygen concentration 50 ppm or less with acceleration voltage 65 kV to become the amount of absorbed radiation of 3 level making use of AITsupplied Min- EBelectron beam illumination device, electron beam was irradiated, ball tackiness of one surface (irradiating surface ) was measured.

Furthermore adhesive was stuck to PET film making use of roll,after removing release liner—, ball tackiness of 2 surface (release liner—side surface ) was measured.

Furthermore, Sony Corporation (DB 69-055-3649 ) make it did film thickness measurement with the; $\mu$ -mate,measured ball tackiness conforming to tilt type ball tackiness JIS Z 0237.

In addition, case where electron beam was irradiated amount of absorbed radiation measured with Far West technology supplied、FWT60-00 dose measurement film .

At that case irradiation condition of electron beam in Table 1, measurement result of the ball tackiness is shown in Table 2.

[0027]

【0028】

[0028]

【表 2】

[Table 2]



## ボールタック

	1面	2面
a	5	7
b	6.5	8
c	7	9

【0029】

表 2 に示すように、1 面より 2 面のほうが必ずタックが大きくなっており、粘着剤塗膜の 2 つの面間で粘着力に差をつけることに成功した。

【0030】

(実施例 2)

この実施例では、粘着剤塗膜の膜厚を 20 $\mu$ m、加速電圧を 50kV に変更した以外は実施例 1 と同様にして実験を行った。

その際の電子線の照射条件を表 3 に、ボールタックの測定結果を表 4 に示す。

【0031】

【表 3】

照射条件				
吸収線量 (kGy)	加速電圧 (kV)	40	80	20
		d	e	f

【0032】

## ボールタック

	1面	2面
d	4	5
e	5	7
f	6	7

【表 4】

【0033】

[0029]

As shown in Table 2, 2 aspects tackiness had become larger than the one surface by all means, succeeded in acquiring difference to tackiness between 2 aspects of adhesive coating.

[0030]

(Working Example 2)

With this Working Example, film thickness of adhesive coating other than modifying 20 $\mu$ m, acceleration voltage in 50 kV, it experimented with as similar to Working Example 1.

At that case irradiation condition of electron beam in Table 3, measurement result of the ball tackiness is shown in Table 4.

[0031]

[Table 3]

[0032]

[Table 4]

[0033]

表 4 に示すように、実施例 1 と同様、1 面より 2 面のほうが必ずタックが大きくなっており、粘着剤塗膜の 2 つの面間で粘着力に差をつけることに成功した。

【0034】

(実施例 3)

この実施例では、粘着剤塗膜の膜厚を 60 $\mu$ m、加速電圧を 80kV に変更した以外は実施例 1 と同様にして実験を行った。

その際の電子線の照射条件を表 5 に、ボールタックの測定結果を表 6 に示す。

【0035】

照射条件			
吸収線量 (kGy)	40	80	20
加速電圧 (kV)	80	g	h
			i

【表 5】

[Table 5]

【0036】

[0036]

ボールタック

	1 面	2 面
g	6	7
h	7	8
i	8	10

【表 6】

[Table 6]

【0037】

[0037]

表 6 に示すように、実施例 1,2 と同様、1 面より 2 面のほうが必ずタックが大きくなっており、粘着剤塗膜の 2 つの面間で粘着力に差をつけることに成功した。

【0038】

(比較例 1)

As shown in Table 6, similarity to Working Example 1,2, 2 aspects tackiness had become larger than one surface by all means, succeeded in acquiring difference to tackiness between 2 aspects of adhesive coating.

[0038]

(Comparative Example 1)

剥離ライナーとして実施例 1 で用いた東セロ株式会社製 SP-PET-B1-50-BU を用い、その上に、上記実施例と同様の電子線硬化型粘着剤を用いて 60 $\mu$ m の粘着剤膜を形成した後、日新ハイボルテージ株式会社製電子線照射装置 EBC-200-20-30 を用い、加圧電圧 150kV、3mA、吸収線量 30kGy の条件で電子線を照射し、実施例と同様にしてボールタックを測定した。

その結果、1 面、2 面ともボールタックの値が 9 であり粘着力に差がみられなかった。

【0039】

(比較例 2)

剥離ライナーとして実施例 1 で用いた東セロ株式会社製 SP-PET-B1-50-BU を用い、粘着性アクリル樹脂を含む粘着剤(東洋インキ製造株式会社製粘着剤 オリバイン BPS3156D)の 100 部とトリレンジイソシアネート誘導体系硬化剤(東洋インキ製造株式会社製硬化剤 BHS8515)の 3 部とを攪拌混合した塗液を乾燥膜厚 40 $\mu$ m となるように粘着塗工し、オーブンで 90 deg C、3 分間乾燥した後、同剥離ライナーを 3kgf/cm<sup>2</sup> の圧力でラミネートして両面テープを得た。

この両面テープから剥離ライナーを剥がすことを試みた結果、10 回中 5 回は粘着剤層 1 面が現れ、残りの 5 回は粘着剤層 2 面が現れ、いわゆる泣き別れ現象を示した。

また、粘着剤層の両面ともボールタックは 9 であった。

【0040】

【発明の効果】

以上説明したように、本発明によれば、粘着剤層の一方の面と他方の面とで粘着力が異なるので、剥離ライナーとして表裏面の剥離性を異ならせた特殊なものを用いずに、剥がす際に必ず一方側の剥離ライナーに粘着剤塗膜が付くようにすることができ、従来よりも低コストでキャストタイプの両面テープを得ることが可能となる。

【0041】

また、電子線硬化型粘着剤に電子線を照射して粘着剤塗膜の一方の面と他方の面とで粘着力が異なる状態とするので、塗膜の膜厚に応

Making use of Tohcello Co., Ltd. make SP-PET-B1- 50-BU which is used with Working Example 1 as the release liner—, on that, after forming adhesive film of 60 $\mu$ m making use of electron beam curing type adhesive which is similar to above-mentioned Working Example, electron beam was irradiated with condition of high voltage 150 kV、3 mA、amount of absorbed radiation 30 kGy making use of Nisshin-High Voltage Co., Ltd. make electron beam illumination device EBC-200-20-30, ball tackiness was measured to similar to Working Example.

As a result, also one surface、2 aspect value of ball tackiness 9, you could not see difference in tackiness.

【0039】

(Comparative Example 2 )

coating liquid which 100 parts of adhesive (Toyo Ink Mfg. Co. Ltd. (DB 69-055-2930 ) make adhesive Oribine BPS31 56D ) which includes tackiness acrylic resin making use of Tohcello Co., Ltd. make SP-PET-B1- 50-BU which is used with Working Example 1 as the release liner—, and 3 part of toluene diisocyanate derivative curing agent (Toyo Ink Mfg. Co. Ltd. (DB 69-055-2930 ) make curing agent BHS8515 ) it agitates mixes was painted in order to become dry film thickness 40  $\mu$ m, sticking , with oven 90 deg C、 3 min after drying, same release liner— was laminated with pressure of 3 kgf/cm<sup>2</sup> and two-sided tape was acquired.

As for result which peels release liner— from this two-sided tape and tried, as for 5 time in 10 times tackifier layer one surface appeared, as for the remaining 5 times tackifier layer 2 aspect appeared, so-called cried and divided and showed phenomena.

In addition, also both surfaces of tackifier layer was as for ball tackiness 9.

【0040】

[Effects of the Invention]

As above explained, according to this invention, because in one surface and other surface of tackifier layer tackiness differs, without using special ones which make release property of front and back surfaces differ as release liner—, by all means adhesive coating that tries is attached to release liner— of one side the occasion where it peels it to be possible , two-sided tape of cast type is obtained with low cost, in comparison with past it becomes possible.

【0041】

In addition, irradiating electron beam to electron beam curing type adhesive, because it makes the state where in one surface and other surface of adhesive coating tackiness differs, if it

じて適切な出力で電子線を照射すればよく、極めて容易に粘着剤塗膜の一方の面と他方の面とで粘着力を異ならせることができる。

# 【図面の簡単な説明】

## 【図 1】

本発明に係る両面テープの構造を模式的に示す側面図。

## 【図 2】

両面テープを巻き取った状態を模式的に示す側面図

## 【図 3】

本発明に係る両面テープの製造方法の製造工程を説明するための図。

## 【図 4】

本発明に係る両面テープの製造方法に好適に用いることができる電子線照射装置の電子線照射部を示す側面図および底面図。

# 【符号の説明】

1  
両面テープ  
2  
剥離ライナー  
3  
粘着剤層  
3a  
粘着剤塗膜  
4  
剥離ライナー側面  
5  
上面

## Drawings

## 【図 1】

should have irradiated electron beam with appropriate output according to film thickness of coating, quite easily with one surface and other surface of adhesive coating tackiness uncommonness trains, る it is possible .

# [Brief Explanation of the Drawing(s)]

## [Figure 1]

side view. which shows structure of two-sided tape which relates to the this invention in schematic

## [Figure 2]

side view which shows state which retracts two-sided tape in schematic

## [Figure 3]

Figure in order to explain production step of manufacturing method of two-sided tape which relates to this invention.

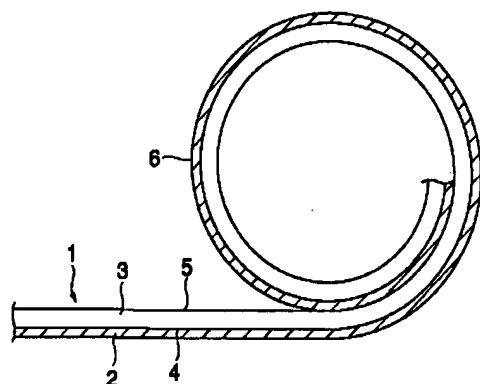
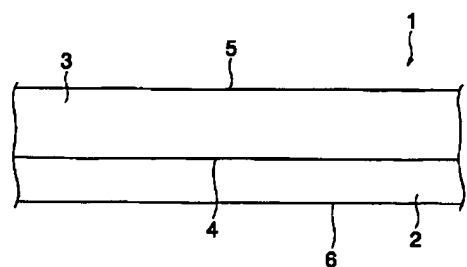
## [Figure 4]

side view and bottom view. which show electron beam illumination section of electron beam illumination device which can be used for ideal in manufacturing method of two-sided tape which relates to this invention

# [Explanation of Symbols in Drawings]

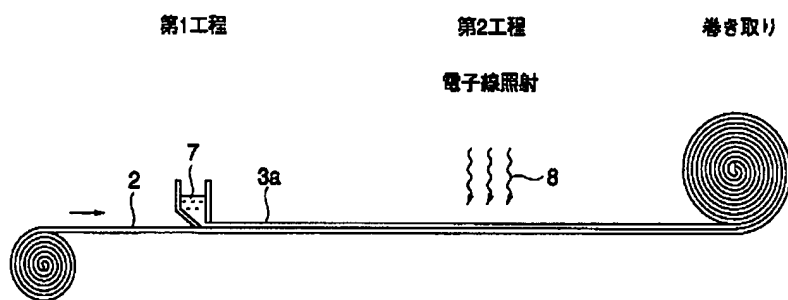
1  
two-sided tape  
2  
release liner—  
3  
tackifier layer  
3 a  
adhesive coating  
4  
release liner—side surface  
5  
upper surface

## [Figure 1]



【図 2】

[Figure 2]



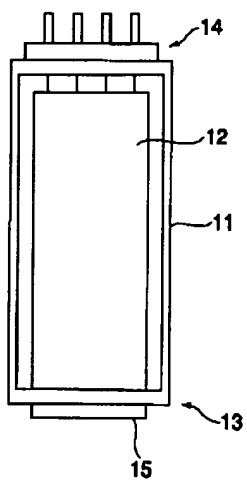
【図 3】

[Figure 3]

【図 4】

[Figure 4]

(a)



(b)

